



**Fisher**  
**Bioblock Scientific**

Parc d'innovation - BP 50111 - F67403 illkirch cedex

**France**

tél 03 88 67 14 14  
fax 03 88 67 11 68  
email infos@bioblock.fr  
www.bioblock.com

**Belgique / België**

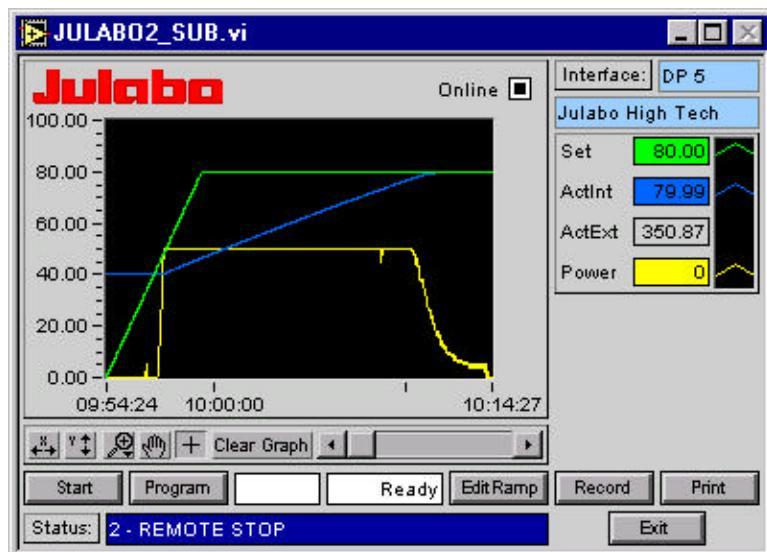
tél 056 260 260  
fax 056 260 270  
email belgium@bioblock.com  
www.bioblock.be

**España**

tfno 91 515 92 34  
fax 91 515 92 35  
email ventas@bioblock.com  
www.es.fishersci.com

# Operating Manual

## Watch & Control 2000



Printed in Germany

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- First thoroughly read the license agreement before starting with installation of the software.  
Should you not agree with the conditions, please return the complete software package promptly to your supplier.

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## 1. Introduction

Watch & Control is a visual display and operating system for laboratory applications.

Watch & Control is based on the LabVIEW® program of National Instrument and will support Windows 95 and Windows NT.

Connection of the laboratory equipment to the PC is established via the PROFIBUS connection or the serial interface ports COM1 or COM 2 of the PC.

Watch & Control enables connection of up to 32 laboratory units via the Profibus.

## 2. Installation

Watch & Control can be installed to run under Windows 95 or Windows NT.

Use of the PROFIBUS necessitates the hardware module DF PROFI (available from COMSOFT) and installation of the associated software in directory C:\DFXX.

### 2.1. Installation of Watch & Control

Installation of Watch & Control is easily and quickly performed with the SETUP.EXE program. Proceed as follows:

1. Insert the CD with the installation program in the corresponding drive of your PC.
2. Activate Windows 95 i.e. Windows NT and start the program SETUP.EXE on the installation CD.
3. Follow the on-screen setup instructions of the installation program.



Please note:

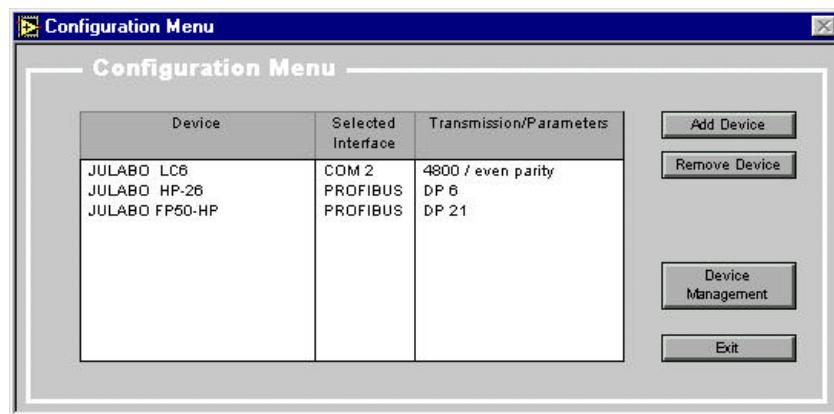
The installation procedure can be interrupted at any time and restarted when desired. Select **Zurück** (backstep) to display the last dialog for rechecking and correction of the entry, if required. To proceed to the next step of the installation sequence select **Weiter** (continue).

## 3. Operation

### 3.1. Configuration

For operation of Watch & Control it is necessary to configure the devices to be connected accordingly. The configuration menu is displayed following the start of Watch & Control.Exe. The menu lists the configured equipment.

A maximum of 10 units from either one or various manufacturers can be hooked up.



**Device Management** On selection of this option, the main menu of Watch & Control is displayed. If Profibus devices are configured, profistart will be initiated prior to display of the main menu.

**Exit** Select this option to exit Watch & Control

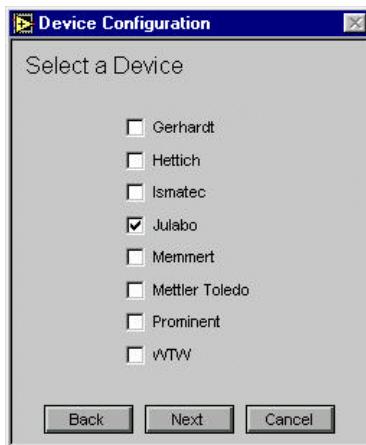
#### 3.1.1. Addition of a new device to the menu list

**Add Device** Select the menu option **Add Device** to add a new device to the menu list.

Then follow these steps:

|   |
|---|
| Click on <b>Back</b> to take an operating step back.        |
| Click on <b>Next</b> to take an operating step forward.     |
| Click on <b>Cancel</b> to return to the Configuration Menu. |

**1. Select a Device** – Click on the name of the manufacturer:

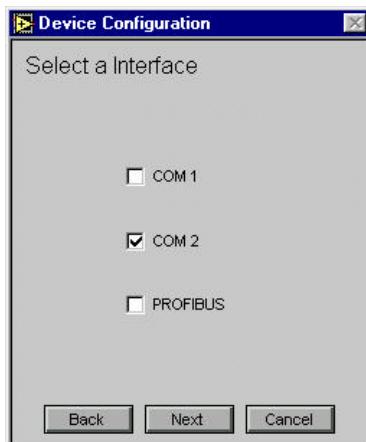


Then click on **Next**.

**2. Select a Interface** – Select the interface by clicking on it with the mouse

The options available are COM1, COM2 or the Profibus-Address.

**Select a Slave-Address** – Additional option with the Profibus-Interface  
(Example: Address 15).

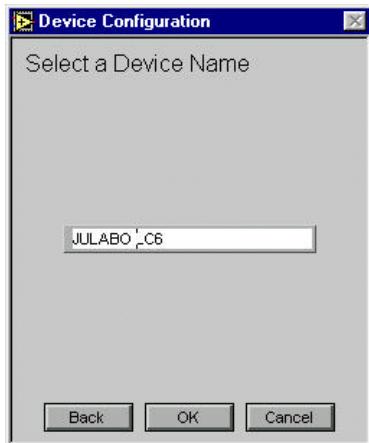


Then click on **Next**

The interface parameters for COM1, COM2 should correspond with the manufacturer's specifications. These specifications are outlined in a chapter for each individual manufacturer.

Please note that with the Profibus system, it is essential that the DP-Address you input corresponds with the address you input for the lab instrument.

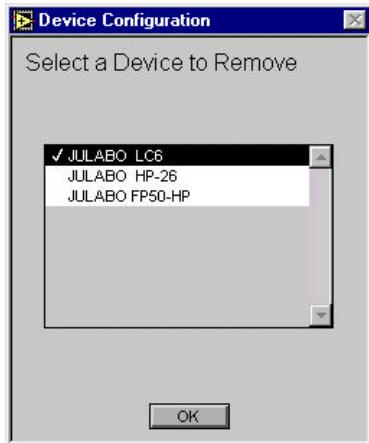
### 3. Select a Device Name - Type in unit name



Click on **OK** to add the new unit to the list.

#### 3.1.2. Deletion of a configured device from the menu list

**Remove Device** Select the device to be deleted from the list with the mouse cursor (highlight the device) and then select the menu option **Remove Device** to delete

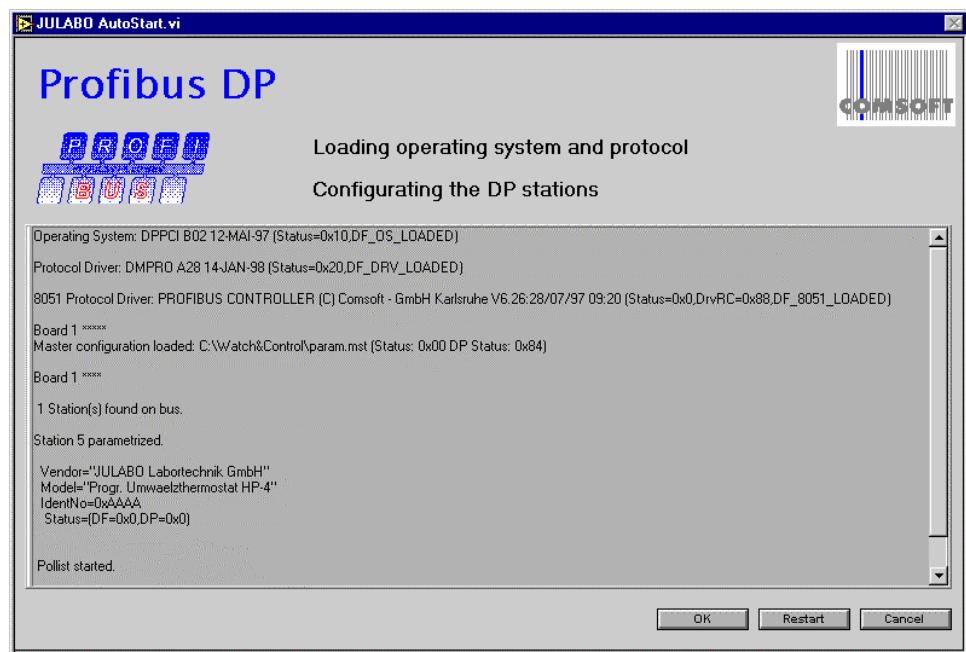


Check the appropriate unit on the list with a **Double Click** (for example. LC6).

Click on **OK** to remove the unit from the list.

### 3.2. Profistart

When Profibus devices are configured, profistart is initiated prior to display of the main menu.



The profistart sequence includes the following steps:

- loading of PROFIBUS operating system into DFPROFI,
- loading of PROFIBUS DP protocol
- loading of PROFIBUS firmware
- configuration of DP end devices

**OK** select to display the main menu of Watch & Control

**Restart** select for restart of Profistart

**Exit** select to exit program

### 3.3. Watch & Control main menu

The Watch & Control main menu consists of two screens, of which only one screen is displayed and active at a time.

Screen 1: Device management (see 3.3.1)

Screen 2: Graph Overview (see 3.3.2)

Selection of the alternative screen is performed by clicking the lowermost left option (Device management or Graph overview)



lowermost menu option of screen 1 (Device management).

Press to select screen 2 (Graph overview)



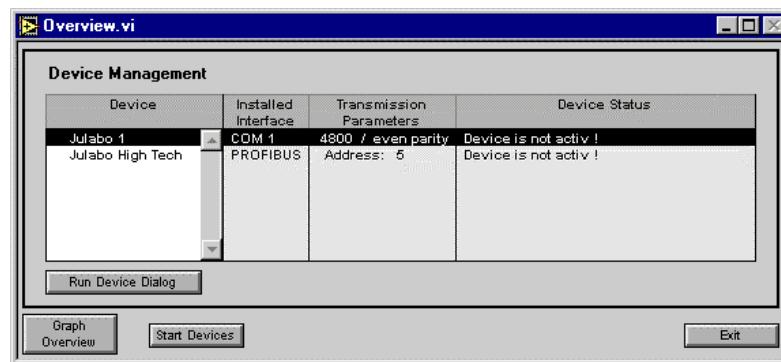
lowermost menu option of screen 2 (Graph overview).

Press to select screen 1 (Device management)

#### 3.3.1. Device management screen of main menu

The device management screen displays a list of all configured devices.

The screen enables the opening of windows, starting and stopping of all active devices and termination of the Watch & Control program.



##### 3.3.1.1. Opening of device windows



This menu option serves opening of the individual device windows. Prior to opening device windows, the relevant devices must first be selected by double-clicking them in the list. Each device thus selected is identified by a checkmark (✓). Each active device is identified by an x (✗).

### 3.3.1.2. Starting and stopping of devices

**Start Devices**

This menu option enables starting and stopping of all active devices equipped with a start/stop function.

### 3.3.1.3. Termination of Watch & Control program

**Exit**

The menu option **Exit** is used to exit (terminate) the Watch & Control program.

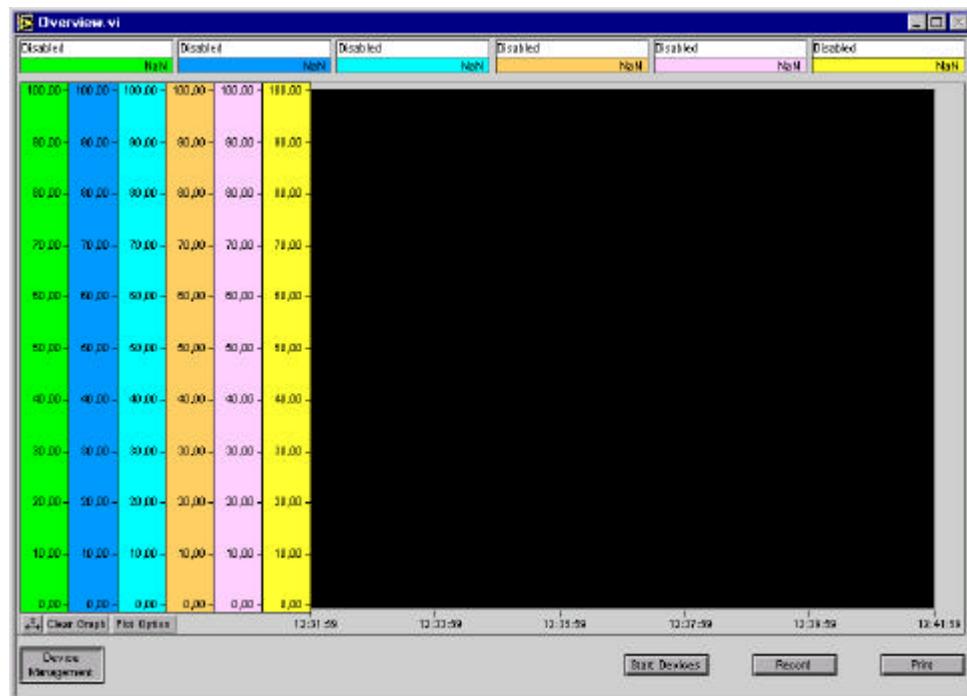


Please note:

To exit the program, all active windows must first be closed!

## 3.3.2. Graph Overview

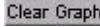
The Graph overview screen enables graphic presentation of the nominal and actual values of different devices. The screen displays a graph with 6 Y-scales. Each Y-scale may be assigned an active device along with a nominal and an actual value. Furthermore, all active devices can be started and stopped, data recorded and a printout of the actual diagram obtained.

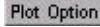


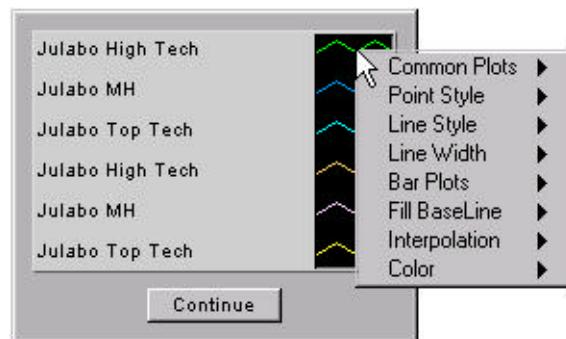
### 3.3.2.1. Graph

The graph screen is used for graphic presentation of data. To display the curve diagram you match the valid range of the scales, otherwise you will be located outside the diagram. Place the mouse cursor inside the scale of the curve diagram and click. Enter the valid range and confirm the entry with Return or by setting the cursor outside the scale and then clicking the mouse. The entered value is saved on clicking.

 When click-selecting the field **X Autoscale**, the X-values of the graph are automatically scaled, that is, the range is continuously and automatically adjusted (fixed) to the minimum and maximum scale values.

 **Clear Graph** Clears all data in the graph when clicked upon.

 **Plot Option** Placing the cursor in the field **Plot Option** and clicking offers a legend enabling selection of colour, line type and dot type for each Y-scale.



- The option **Common Plots** enables configuration of one of the six most frequently used plot styles including scatter plot, bar plot and fill-to zero-plot. The options of this submenu enable configuration of point, line and diagram fill attributes in a single step

- The options **Point Style**, **Line Style** and **Line Width** display styles by which the different plots can be distinguished. The submenu „Line Width“ offers line widths above the 1 pixel standard as well as a hairline option. The hairline option cannot be viewed on the screen but will appear as a very fine line upon printout on a printer supporting the hairline option. The option **Bar Plots** serves selection of vertical bars, horizontal bars or no bars as desired.
- The option **Fill Baseline** determines the point up to which the base line is filled. **Zero** fills from the plot to a base line generated by 0. **Infinity** fills from the plot up to the positive edge of the graph, while - **Infinity** fills from the plot to the negative edge of the graph. The lower part of this menu provides for selection of a specific plot of the graph for filling purposes
- The option **Interpolation** determines how lines are drawn between data points. The first option omits the line, making this option suitable for scatter plots. The option at the lower left draws a straight line between points. The two staircase options connect points at right angles, making these options suitable for histogram-type plots. The option at the upper right first draws the Y-axis, while the option at the lower left first draws the X-axis
- The option **Color** displays the colors available for the plot

**Continue**

Place the cursor in this field and click to save the changes



Please note:

The function **Clear Graph** does not influence data recording

### 3.3.2.2. Assignment of a device to a Y-scale



Assignment of a device to a Y-scale is accomplished with two pulldown menus, of which the upper serves selection of a device, while the lower is used for selection of a nominal and an actual value.

**Julabo High Tech** First click-select the upper pulldown menu and select a device.

**Set 20.00** After selection of a device, the lower menu will show a corresponding list of nominal and actual values. Select a nominal and actual value from the list.



Please note:

The upper pulldown menu lists only active devices. Prior to an assignment, the corresponding device window in the Device Management screen must first be opened.

### 3.3.2.3. Starting and stopping of devices

**Start Devices** The menu option Start Devices/Stop Devices enables starting and stopping of all active devices equipped with a start/stop function.

### 3.3.2.4. Data recording

**Record**

The option **Record** enables the recording of data. The data recorded is time-encoded and saved as ASCII format. Recording of the text file will continue until the data record function is cancelled. On click-selection of the field the following dialog window is displayed:



This serves preselection of the recording time (0...3600 s), that is, the time interval at which data recording is to take place

**Apply**

confirm entry

**Cancel**

Stop data recording

### 3.3.2.5. Printout

**Print**

Use this function to print out the diagram



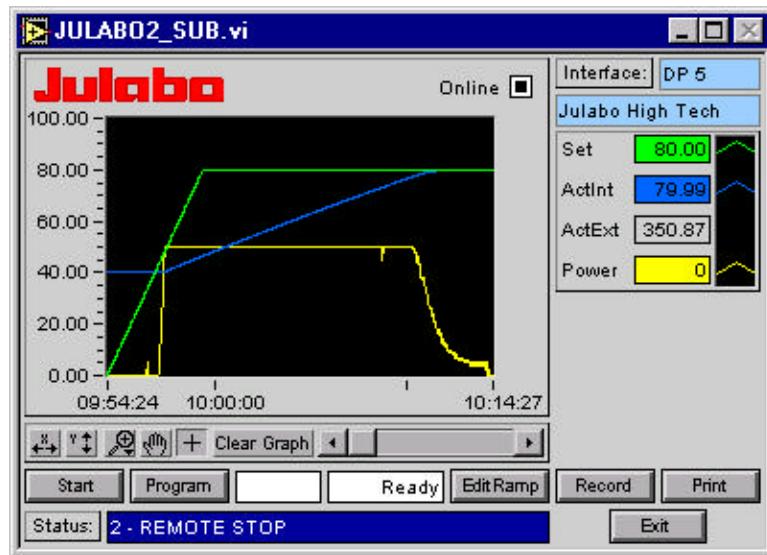
Please note:

Printout will take place on the default printer configured to run under Windows.

## 4. Laboratory devices

### 4.1. Julabo

The operating and visual display screen shown below supports the Julabo devices HighTech, TopTech, Circulators and devices of the Julabo MH-series:



#### 4.1.1. Graph

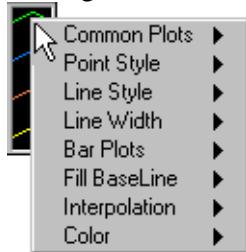
The graph screen serves graphic presentation of data. To display the curve diagram, match the valid range of the scales, otherwise you will be located outside the diagram. Place the mouse cursor inside the scale of the curve diagram and klick. Enter the valid range and confirm the entry with Return or by setting the cursor outside the scale and then clicking the mouse. This saves the entered value.

#### 4.1.2. Graph Online/Offline

- **Online-Modus**. The graph is online, meaning it is continuously updated with new data. Thus, you are always provided with the actual data as well as with the previous data.
- **Offline-Modus**. The graph is not working in the online mode, enabling you to display a desired area by defining the value range of the scale. It is thus possible to edit the displayed area with the graph submenu quickly and easily. On switchover to the online mode the time base is automatically synchronized..

#### 4.1.3. Graph legend

The legend serves selection of color, line type and dot type.



- The option **Common Plots** enables configuration of one of the six most frequently used plot styles including scatter plot, bar plot and fill-to zero-plot. The options of this submenu enable configuration of dots, line and diagram fill attributes in a single step.
- The options **Point Style**, **Line Style** and **Line Width** display styles by which the different plots can be distinguished. The submenu „Line Width“ offers line widths above the 1 pixel standard as well as a hairline option. The hairline option cannot be viewed on the screen but will appear as a very fine line upon printout on a printer supporting the hairline option.
- The option **Bar Plots** serves selection of vertical bars, horizontal bars or no bars as desired.

- The option **Fill Baseline** determines the point up to which the base line is filled. **Zero** fills from the plot to a base line generated by 0. **Infinity** fills from the plot up to the positive edge of the graph, while **- Infinity** fills from the plot to the negative edge of the graph. The lower part of this menu provides for selection of a specific plot of the graph for filling purposes.
- The option **Interpolation** determines how lines are drawn between data points. The first option omits the line, making this option suitable for scatter plots. The option at the lower left draws a straight line between points. The two staircase options connect points at right angles, making these options suitable for histogram-type plots.  
The option at the upper right first draws the Y-axis, while the option at the lower left first draws the X-axis.
- The option **Color** displays the colors available for the plot. Click-selecting „T“ in the Color option will clear a plot from the screen.



Please note:

Clearing the screen of a plot does not influence data recording

#### 4.1.4. Graph submenu

The graph submenu provides for changing several characteristics of the plot during its running time. By click-selection of the appropriate option fields of the submenu it is thus possible to scale the X and Y-axis, displace the display area and bring a predecided area into focus.



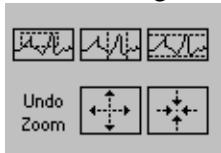
Click-selection of the option field **X Autoscale** will automatically and continuously scale the X-axis data of the graph within the decided minimum and maximum scale values.



Click-selection of the option field **Y Autoscale** will automatically and continuously scale the Y-axis data of the graph within the decided minimum and maximum scale values.



Click-selection of the option field **Zoom Tool** will display a popup menu offering various methods of zooming.



The following zoom options are available:



**Zoom by rectangle** Use the cursor to draw a rectangle around the area you wish to zoom. On release of the cursor, the X- and Y-axis will be so scaled, that only the area marked by the rectangle will be displayed.



**Zoom by Rectangle in X** Limits the zoom to the X-axis data. The Y-axis scaling remains unchanged



**Zoom by Rectangle in Y** Limits the zoom to the Y-axis data. The X-axis scaling remains unchanged



**Undo Last Zoom** Returns the X- and Y-scales to their previous settings.



**Zoom In about a Point** Select a specific point with the mouse cursor and keep it selected by holding the mouse button depressed. The graph will be continuously enlarged until the mouse button is released.



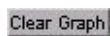
**Zoom Out about a Point** Select a specific point with the mouse cursor and keep it selected by holding the mouse button depressed. The graph will be continuously down-scaled (reduced) until the mouse button is released.



Click-selection of the option field **Panning Tool** will select an operating mode which allows you to scroll the displayed data by pulling certain areas of the graph.



Normally the device is operating in the standard mode, allowing click-selection and movement of the cursor.



**Clear graph** On click-selection of the option field **Clear Graph** the graph will be cleared of all data



Please note:

The function **Clear Graph** does not influence data recording

#### 4.1.5. Setting the nominal value

**Set**  For setting the nominal value click-select the field **SET** in the menu and enter the desired value. Confirm the entry with Return or move the mouse cursor outside the field area and click



Please note: A new nominal value can only be entered in the field **SET** when the function **Program** is deactivated. In the active state of the function **Program**, the field **SET** is rendered inoperative

#### 4.1.6. Temperature displays

**ActInt**  The actual bath temperature is displayed in the field **ActInt**.

**ActExt**  The actual temperature measured by the external measurement-and control sensor is displayed in the field **ActExt**.

#### 4.1.7. Heating power display

**Power**  The field **Power** displays the actual heating power.

#### 4.1.8. Start/Stop



The **Start/Stop** function enables starting and stopping of the device.

#### 4.1.9. Program



The **Program** function enables starting of a loaded temperature ramp. The ramp can be interrupted and restarted at any time by pressing the Start/Stop button. The predecided nominal value and the time are stopped for the interruption.



The **Ramp Rated Value** field displays the actual nominal ramp value.



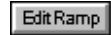
The **Countdown&Message** field displays the remaining ramp time or the ramp status (No ramp = no ramp loaded; Ready = ramp loaded and ready; Wait = ramp on standby)



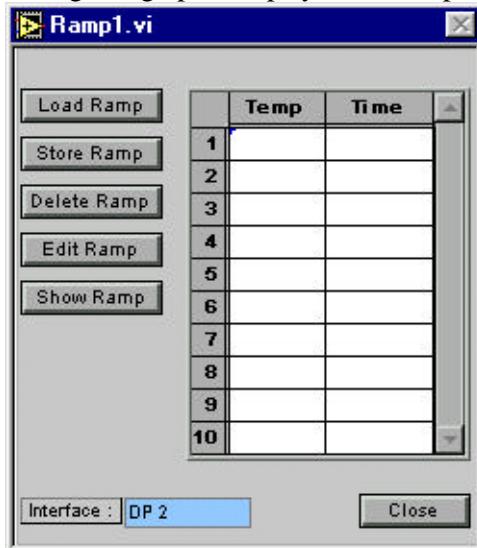
Please note:

When the function **Program** is activated, the function **Edit Ramp** is automatically deactivated i.e. not displayed. In addition, the field **SET** is also deactivated and no new nominal value can be entered here

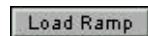
#### 4.1.10. Ramp functions



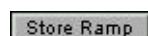
The function Edit Ramp provides for loading, saving, deleting, editing and graphic display of the ramp.



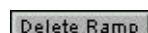
Ramp window



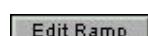
Select to load ramp



Select to save ramp



Select to delete ramp



Select to edit ramp

The function provides for programming up to 64 ramp steps. The loop function enables ramp sections to be repeated up to 99 times. Each section is defined by temperature (projected end temperature) and duration (time). The end temperature is identical with the nominal temperature reached at the end of a section. By evaluation of the time and temperature differences, the program computes and establishes a temperature ramp. The program sequence considers every section for which a nominal temperature has been entered. Looping is started with **loop x** in column **Time**, x representing the number of repetitions, and

ended with **endloop** in the same column.

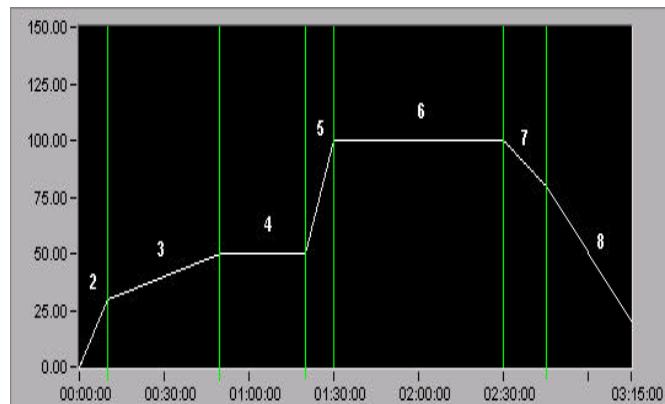
On confirmation of the entry **loop x** i.e. **endloop**, the nominal temperature is automatically assigned the value 0.00. This value, however, is not considered by the program.

The time assignment of 00:00:00 to a particular section results in the program being continued with the next section only after the nominal temperature of the present section has been reached.

Example: Ramp with 5 repetitions

|    | Temp   | Time    |  |
|----|--------|---------|--|
| 1  | 0.00   | loop 5  |  |
| 2  | 30.00  | 0:10:00 |  |
| 3  | 50.00  | 0:40:00 |  |
| 4  | 50.00  | 0:30:00 |  |
| 5  | 100.00 | 0:10:00 |  |
| 6  | 100.00 | 1:00:00 |  |
| 7  | 80.00  | 0:15:00 |  |
| 8  | 20.00  | 0:30:00 |  |
| 9  | 0.00   | endloop |  |
| 10 |        |         |  |

Graphic display of the first sequence run



Please note:

Several loops may be programmed successively, but they must not overlap and one loop cannot be contained within another loop.

The options **Copy Data**, **Cut Data** and **Paste Data** of the pop-up menu (right mouse key) enable copying, separation (cutting) and insertion of data.

Example: Copying of data:

Mark the data area to be copied and click-select the option **Copy Data** in the pop-up menu

|    | Temp   | Time    |
|----|--------|---------|
| 1  | 30.00  | 0:10:00 |
| 2  | 50.00  | 0:40:00 |
| 3  | 50.00  | 0:30:00 |
| 4  | 100.00 | 0:10:00 |
| 5  | 100.00 | 1:00:00 |
| 6  | 80.00  | 0:15:00 |
| 7  | 20.00  | 0:30:00 |
| 8  |        |         |
| 9  |        |         |
| 10 |        |         |

Insertion of data:

To overwrite a data section with the copied data select the section to be overwritten and click-select the option **Paste Data** in the pop-up menu

Select section

|    | Temp   | Time    |
|----|--------|---------|
| 1  | 30.00  | 0:10:00 |
| 2  | 50.00  | 0:40:00 |
| 3  | 50.00  | 0:30:00 |
| 4  | 100.00 | 0:10:00 |
| 5  | 100.00 | 1:00:00 |
| 6  | 80.00  | 0:15:00 |
| 7  | 20.00  | 0:30:00 |
| 8  |        |         |
| 9  |        |         |
| 10 |        |         |

Insert data

|    | Temp   | Time    |
|----|--------|---------|
| 1  | 30.00  | 0:10:00 |
| 2  | 50.00  | 0:40:00 |
| 3  | 80.00  | 0:15:00 |
| 4  | 100.00 | 0:10:00 |
| 5  | 100.00 | 1:00:00 |
| 6  | 80.00  | 0:15:00 |
| 7  | 20.00  | 0:30:00 |
| 8  |        |         |
| 9  |        |         |
| 10 |        |         |

To insert the copied data, move the mouse cursor to left edge of the chart so that an arrow appears. Move the arrow to the chart position at which the data is to be inserted. Select a pop-up menu and click-select the option **Paste Data** in the menu.

Mark position

|    | Temp   | Time    |
|----|--------|---------|
| 1  | 30.00  | 0:10:00 |
| 2  | 50.00  | 0:40:00 |
| 3  | 50.00  | 0:30:00 |
| 4  | 100.00 | 0:10:00 |
| 5  | 100.00 | 1:00:00 |
| 6  | 80.00  | 0:15:00 |
| 7  | 20.00  | 0:30:00 |
| 8  |        |         |
| 9  |        |         |
| 10 |        |         |

Insert data

|    | Temp   | Time    |
|----|--------|---------|
| 1  | 30.00  | 0:10:00 |
| 2  | 50.00  | 0:40:00 |
| 3  | 50.00  | 0:30:00 |
| 4  | 80.00  | 0:15:00 |
| 5  | 100.00 | 0:10:00 |
| 6  | 100.00 | 1:00:00 |
| 7  | 80.00  | 0:15:00 |
| 8  | 20.00  | 0:30:00 |
| 9  |        |         |
| 10 |        |         |

## Separation (cutting) of data:

To separate a data block or section, mark it and click-select the option **Cut data** in the pop-up menu

Mark data section

|    | Temp   | Time    |
|----|--------|---------|
| 1  | 30.00  | 0:10:00 |
| 2  | 50.00  | 0:40:00 |
| 3  | 50.00  | 0:30:00 |
| 4  | 100.00 | 0:10:00 |
| 5  | 100.00 | 1:00:00 |
| 6  | 80.00  | 0:15:00 |
| 7  | 20.00  | 0:30:00 |
| 8  |        |         |
| 9  |        |         |
| 10 |        |         |

Separate (cut) data

|    | Temp   | Time    |
|----|--------|---------|
| 1  | 30.00  | 0:10:00 |
| 2  | 50.00  | 0:40:00 |
| 3  | 50.00  | 0:30:00 |
| 4  | 100.00 | 0:10:00 |
| 5  | 100.00 | 1:00:00 |
| 6  | 20.00  | 0:30:00 |
| 7  |        |         |
| 8  |        |         |
| 9  |        |         |
| 10 |        |         |

The option **Empty Table** of the pop-up menu provides for deletion of all data in the chart. The option for display of a specific data section can be activated and deactivated with **Show Selection** in the pop-up menu

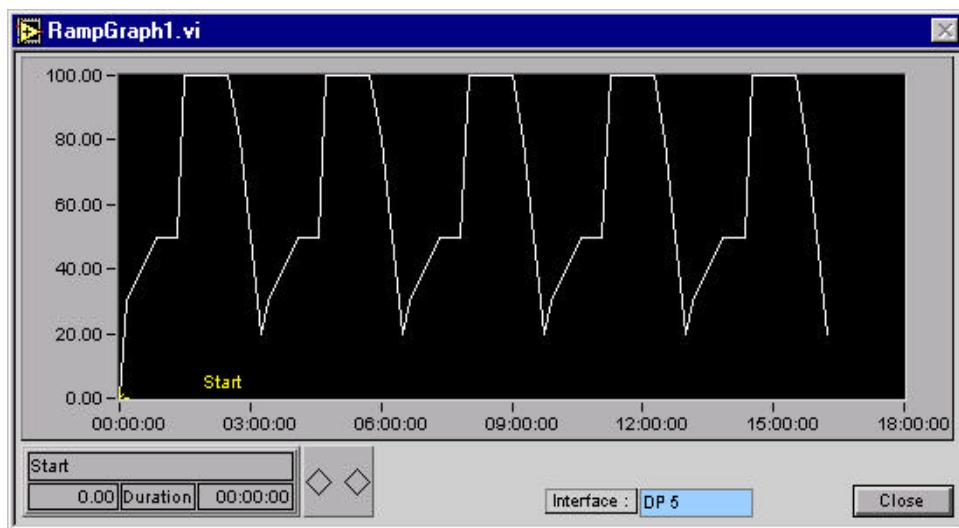
Please note:



Only the visible section can be marked. To mark a larger section, it is necessary to press the SHIFT button before continuing with the out-of-bounds marking.

**Show Ramp**

The function **Show Ramp** enables graphic presentation of the established ramp. On click-selection of this option i.e. field, the following screen will be displayed:



The scaling of the scales can be changed. To do so, use the mouse to place the cursor inside the scale of the ramp diagram and click. Enter the scaling value and confirm the entry with Return or by clicking outside the scale. The new value will be saved on clicking.



The graph includes a cursor. By clicking onto the arrows in the cursor field, the individual ramp steps will be displayed in the direction of the arrow (ascending or descending order). To manually move the cursor, use the mouse to select and pull it in the graph.

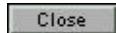


The programmed ramp step is displayed in the upper part of the display and in the graph. The nominal temperature is displayed on the lower left and the time duration at the lower right of the screen.

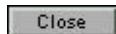


Please note:

Since the actual nominal temperature can be changed during ramp programming, the graphic ramp display will always begin at zero. Also, no time i.e. duration can be defined for sections to which 00:00:00 has been assigned.



Enables closing of the graphic ramp presentation screen.

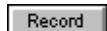


Enables closing of the ramp functions screen

Please note:

Only one ramp function can be active at a time. When the **Edit Ramp** function is active, the **Program** function in the operating and display window is deactivated i.e. not displayed.

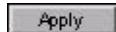
#### 4.1.11. Recording of data



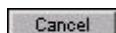
The function **Record** enables the recording of data. The recorded data is time-encoded and saved as ASCII format. Recording of the text file will continue until the data record function is cancelled. On click-selection of the field the following dialog window is displayed:



This window serves preselection of the recording time (0...3600 s), that is, the time interval at which data recording is to take place



Confirm entry



Cancels the data recording function



Please note:

Printout will always take place on the default printer configured under windows.

#### 4.1.12. Printing



Enables printout of diagram



Please note:

Printout will always take place on the default printer configured under windows

#### 4.1.13. Closing the window



Closes the window when selected

## 5. Error messages

### 5.1. Serial interface connection

- Serial Port Init

error occurred during initialization of interface ports.

Check interface ports COM1, COM2

- Serial Port Write

Error occurred during transmission.

Check transmission line and device (incorrect transmission speed, wrong number of data or stop bits, incorrect parity or wrong port)

- Serial Port Read

Error occurred on reading.

Check transmission line and device (incorrect transmission speed, wrong number of data or stop bits, incorrect parity or wrong port)

- Serial Port Timeout

Error occurred on reading.

Check transmission line and device (incorrect transmission speed, wrong number of data or stop bits, incorrect parity or wrong port)

## **5.2. Profibus**

- **DP-ADDRESS OUT OF ORDER**

Profibus device not switched on or not working properly.

Check device (switch device off and on, if needed)

- **DP-ADDRESS INVALID**

No communication with profibus device or interference on transmission line.

Check profibus line (switch device off and on, if needed)

- **PROFIBUS COMMUNICATION ERROR**

General profibus error.

Check profibus line, restart PC (power off), if required

- **WINDOWS-DRIVER FAULT**

Windows NT driver not working properly.

Incorrect installation of COMSOFT DF PROFI

## **5.3. Device identification**

- Version identification

No or faulty identification. Check device (wrong device may be connected)

## **5.4. Laboratory equipment error messages**

For information on the meaning of the displayed error messages please refer to the User Manual of the corresponding laboratory equipment